VASSAR COLLEGE LIBRARY
NOV 28 1950

THE UNIVERSITY OF THE STATE OF NEW YORK

BULLETIN TO THE SCHOOLS

VOLUME 36 MARCH 1950 NUMBER 7

. . . Contents . . .

PAGE

COVER PICTURE: Red-winged Blackbird, from a painting by Edmund J. Sawyer

Bird, Arbor and Wild Life Days, *Francis T. Spaulding* 189

The Black Bear: A Good Citizen, *J. R. Matson* 190

How Well Do You Know the Robin? *Harold H. Axtell* 195

This State Takes Care of Its Trees, *E. W. Littlefield* 200

Let's Visit a Wildlife Sanctuary, *Alvah W. Sanborn* 204

Wild Plants Thrive in Rock Gardens, *Frederick Houghton* 209

Birds near the New Jersey Border, *Robert F. Deed* 213

Learn To Live Out of Doors, *Ellsworth Jaeger* 217

The Forest and the Soil, *Svend O. Heiberg and Donald P. White* 221

A Bird with a History, *Ralph S. Palmer* 227

Water Chestnut: A Foreign Menace, *William T. Winne* 230

When the Indian Feasts, *H. E. Wheeler* 234

Eastern Red-Wing, Guardian of the Marsh, *Myrtice A. Blatchley* ....Cover page 3

• • •

THE UNIVERSITY OF THE STATE OF NEW YORK

BULLETIN TO THE SCHOOLS

Issued monthly during the school year by the State Education Department

CHARLES F. PROBES, *Editor* MILDRED HAND, *Assistant*

This bulletin is sent without charge to all schools and educational institutions of the State. To others it will be mailed postpaid for 50 cents a year, 10 cents for single copies.

Entered as second-class matter September 30, 1914, at the post office at Albany, N. Y., under the act of August 24, 1912. Acceptance for mailing at special rate of postage provided for in section 1103, act of October 3, 1917, authorized July 19, 1918.

A416m-Mr50-13,500(30838)*

UNIVERSITY OF THE STATE OF NEW YORK PRESS

The University of the State of New York
Bulletin to the Schools

VOLUME 36 MARCH 1950 NUMBER 7

Bird, Arbor and Wild Life Days

OF THE GRASMERE VALE Wordsworth wrote:

What want we? have we not perpetual streams,
Warm woods, and sunny hills, and fresh green fields,
And mountains not less green, and flocks, and herds,
And thickets full of songsters, and the voice
Of lordly birds, an unexpected sound
Heard now and then from morn to latest eve,
Admonishing the man who walks below
Of solitude, and silence in the sky?
These have we, and a thousand nooks of earth
Have also these, but no where else is found,
No where (or is it fancy?) can be found
The one sensation that is here; .....
'tis the sense
Of majesty, and beauty, and repose,
A blended holiness of earth and sky .....

Wordsworth might have been writing of our own State of New York and his lines seem most appropriate for me to quote, when by virtue of my office and in accordance with the law, it is my pleasurable duty to proclaim that Arbor Day and Wild Life Day are to be observed in New York State this year on April 28th, May 5th or May 12th, whichever may best suit the convenience of each locality. And further, I designate April 21st as Bird Day.

Francis T. Spaulding

Commissioner of Education

While this issue was in press, Commissioner Spaulding died suddenly on March 25th. The April issue will include an account of his career.

The Black Bear: A Good Citizen

Adaptable, Courageous and Intelligent, Bruin Is Also the Clown of the Woods

J. R. MATSON
Perry, New York

IF THERE IS ONE characteristic of the black bear on which all students can agree, it is his adaptability. Although he has the physical qualifications of the aggressive flesh eaters, he has of necessity become a mild-mannered vegetarian. Strong, well-armed and by no means cowardly, he has learned that the price of survival in proximity with man is silence, shyness and furtiveness. To survive on the seasonal food supply of northern climates he accumulates a reserve of fat during the season of plenty and conserves his fuel during the scarcity of cold winter by becoming dormant. Asking no favor of man or the forces of nature, he thrives where other species have declined or disappeared. Intelligent and adaptable, he conforms to the various conditions of his wide range. For that reason, together with his elusiveness, there is much misunderstanding and controversy concerning his characteristics and habits. All can agree, however, that he is adaptable. He deserves our most favorable consideration.

Bruin has been characterized as the "clown of the woods." The antics of captives or the semidomesticated bears observed in sanctuaries tend to confirm this characterization. Recently a wild bear strolled down a forest trail toward a party of summer vacationists. He appraised the party with a philosophical mien, then sat down and thoughtfully scratched his right ear with his left hind foot. It would be difficult to convince those people that the black bear is not a clown.

Those who have seen the destruction wrought by a large bear caught fast in a steel trap are convinced of his ability to do damage. Recently a large male dragged a 12-foot clog more than a mile, uprooting saplings and dislodging boulders — a feat of strength and endurance comparable to the capacity of a stout team of horses. The fact that the bear was dead from exhaustion when found did not detract from our respect for his ability. A trapped bear sometimes will drag a heavy clog beyond the scene of his struggles and when found will appear indifferent or lethargic. The experienced trapper is not misled by appearances. He knows the bear's power of recovery, that a new stimulus may set off an explosion of renewed energy not conducive to the trapper's health.

Once a bear has escaped from a trap it is practically impossible to take him again by the same or similar method. A revealing incident was noted in Maine where a bear had torn a hole through the side wall of a hunting camp to enter and another hole for his exit. Returning a few days later to set a trap, the woodsman found nine holes, five for entry and four for exit. The door and windows were intact. It might appear that the bear was still in the camp but such was not the case. In his four visits he had ransacked the interior thoroughly, rear-

ranging the contents as only a patient and painstaking bear can. He had discovered a supply cupboard built against the wall and closed only by a flimsy door. Evidently he was suspicious of doors and windows; suspicious even of his own ports of entry and exit. He tore another hole to get out, then tore into the cupboard from outside, pulling the contents out into the yard. Having completed his inventory he left and has not been heard from since. A bear psychologist might infer that this bear had, at some time, an unpleasant experience with a trap set at a door or window or other opening in an unoccupied building. Probably his inference would be correct. And so it goes in countless incidents which demonstrate the bear's adaptability. He is versatile and unquestionably he connects cause with effect.

He has learned that he can not contend with man; that flesh and blood can not withstand the triphammer blows of the modern rifle. Unless he is fast in a trap or bayed by dogs it is practically impossible to corner a bear. When surprised in the wild he will almost invariably flee in panic. On rare occasions he may bristle and bluff, his object apparently being to create an opportunity, usually successful, for retreat with honor. More rarely he has been known to threaten persistently. Although instances of unprovoked attack on men have been reported, such instances are so rare in relation to opportunities for aggression as to be negligible.

What, then, is the answer to this "danger" business? The answer, my friends, will vary with the experience of the individual. The black bear may be a clown to some, dangerous to others, unpredictable to still others. Those hundreds of thousands of woodsmen who have worked millions of days and have slept on the ground, unprotected and unmolested, millions of nights in bear

Courtesy Pennsylvania Game Commission

Cubs in Their Nest

country will probably have no opinion, having never thought of danger of attack by bears. The bear hunter is unquestionably safer than the driver of an automobile or the pedestrian at a busy intersection.

It is "common knowledge" that a hungry bear or a mother with cubs is looking for trouble. Although isolated instances have been reported to support this belief, the writer recalls no such incident in his own experience or in that of bear hunter friends of 40 years' standing. That is not to say that such incidents never occur; merely to state that there have been no unpleasant incidents in the lifetimes of about a score of lifelong bear hunters. While a domestic dog quite commonly resents interference with its young or its food, a wild bear will normally and with little show of resentment leave its food or abandon its young. Dormant females with young commonly abandon their cubs when routed from the winter nest. Scores of cases of abandonment, at all seasons and under varying circumstances, have been reported. Those who hunt bears with dogs in spring are continually bothered by cubs which tree readily while the old bear continues her flight, thus obtaining a long lead on dogs and hunter.

Courtesy of the Author

Young, But an Expert Climber

While by no means a common occurrence, the finding of a bear in the winter nest is not extremely rare. Observation of a score or more of such incidents suggests that while the dormant female with new-born cubs may leave her nest on slight disturbance by man, she is less likely than the male to do so. She may arouse without leaving her nest and cubs, but when repeatedly disturbed and especially if alarmed, she will usually leave them. She may show some resentment; more commonly she will not. The mother bear seldom returns to new-born cubs after having to abandon them in cold weather. In such cases the cubs die of exposure within a short time. Cases of abandonment are on record with conservation agencies, and many instances could be cited of observations by private individuals.

The cubs are born in the winter nest during the dormant period of the mother. Like premature human babies they require tender nursing. They weigh less than a pound at birth, are practically naked and are blind and helpless for several weeks after birth, seeking only the mother's warmth and nourishment. Our ideals of motherhood would have us

believe the old bear invariably fights for her babies. It is rather disappointing to relate that this is not the case. If she did so, she, as well as the cubs, would be doomed. It would be very difficult, if not impossible, for her to save her family when driven from her carefully prepared winter nest in cold weather. She acts for the preservation of the species when she saves her own life by flight while sacrificing her cubs in a situation she regards as one of mortal danger. During the era of C. C. C. camps many cubs abandoned by mothers on contact with men were captured by the boys. In certain areas where bears were protected this became such a problem that game officials were obliged to hold commanding officers responsible for illegal possession. No reprisals by mother bears were reported.

Dwellers in backwoods areas of several eastern states describe the cry of bears in an interesting variety of ways: as "hoot," "whoop," "holler," "like a man," "like a woman," "bawling," "like a night bird," "whickering" etc. The cry is supposedly associated with the mating period and is reported as occurring variously from May to November. Whatever may be said of the cry, mating is supposed to have some relation to the known period of gestation and time of birth, so we might take that interpretation with a pinch of salt.

Reputable naturalists have reported the cry of bears in no uncertain terms. A conservation official's reply to a letter of inquiry states, "Bears are capable of a wide repertoire of sounds and are extremely vocal." A professional bear hunter writes, "The only sounds I ever knew wild bears to make were the usual ones when bayed by dogs, or a blat when struck by a bullet." A retired game warden asserts, "The only sounds I ever heard were when a bear was hung in a trap or held by dogs. The female makes small sounds to the cubs." There can be no doubt that bears are capable of making a variety of vocal sounds. The bear is intelligent, however, and silence in the wild state has a great survival value. Experienced observers seldom assert positive identification of the cry of bears in the wild. Let's dismiss this question as "too hot to handle."

Serious students have made exhaustive studies of bear diet. It has been demonstrated that their food is principally vegetable, and that they thrive in areas where there is not enough meat to grease a skillet. They are opportunists and eat what is most readily available. In hard times they will eat anything that will go down their gullet, with slight concern for its nutritional or "medicinal" value. Sometimes a bear forgets he is supposed to be a vegetarian and kills a sheep, pig or cow. For these rare lapses of individuals the entire tribe has been branded as criminal in some states, with a bounty on their scalps. But the black bear, living principally on vegetable matter and dormant three to five months of the year, can not fairly be classed with the confirmed predators, the wolf, the bobcat and the cougar.

In April 1948 a bear was reported as feeding on the frozen carcass of a cow. Within 24 hours he was shot while feeding at the carcass. His stomach contained only the content of the deceased cow's stomach — to wit, about a peck of dried grass and desiccated apples. That individual, at least, preferred a vegetable diet. Among backwoods hunters there is a proverb: "Believe nothing you hear and only half of what you see." That applies well to reports concerning bears. To be sure, there are outlaws among bears, probably in about the same proportion as among the men who live on your street.

Courtesy of the Author

Black Bears Climb Tall Trees To Rest and Sleep

And how about "hibernation"? Don't they go into a cave and close the entrance to exclude the weather? Don't they come out in springtime "thin and hungry"? That is a long and interesting story, but space is limited. Briefly, the black bear is not a true hibernator. In our northern climate he becomes dormant when he has accumulated a reserve of fat sufficient to sustain him through the winter, spring and early summer months until fruits ripen. During that time he absorbs his reserve, slowly during the dormant phase, more rapidly in spring when active on a deficient diet. Cold appears to influence dormancy only by its effect on food supply. In the dormant state his condition differs materially from that of the true hibernators in that his temperature and respiration are not so drastically reduced. He is easily roused and promptly regains full possession of his faculties.

His winter nest is commonly made under the overhang of rocks or ledges, sometimes under a stump or brush pile where he is but partially sheltered from the elements. Not infrequently he sleeps the winter away on a bed of leaves in the open with no protection other than his heavy underwear (an inch or two of fat), a fur coat and a blanket of snow. He doesn't mind the cold a bit. Papa bear sometimes wakens just for no reason at all and wallows around in the deep snow. Mama, of course, can't leave the children.

Some people say the bears look fat in spring due to empty fat cells from which the oil has been absorbed and which collapse in a few days. Well, perhaps, but last year a thrifty New England housewife flensed the carcasses of seven bears killed in May and June, from which she rendered more than 40 gallons of oil. Bear oil is good for shortening biscuits, greasing boots, hair tonic etc. But the point is you can't get 40 gallons of bear's oil from empty fat cells.

The black bear has solved the problem of survival over a wider range of space and conditions than have his cousins, the grizzly and the polar bear. In his wider range he has met competition with men to a greater extent than they. In making his adjustment to the dominance of man he has retained a cheerful spirit of industry and a sense of humor that entitle him to our sympathetic understanding and respect. He is a good citizen. The woods would lose much of their charm and mystery without him.

We must learn that there is more of interest and satisfaction in the study of a living wild animal than in a trophy with glass eyes and a varnished nose.

How Well Do You Know the Robin?

The Familiar Red-breasted Summer Boarders Have More Personality Than You May Realize

HAROLD H. AXTELL
Curator of Biology
Buffalo Museum of Science

HOW WELL ACQUAINTED are you with the family of robins which, in their obvious opinion, own the place where you live? Have you missed the opportunity to become friends with these co-owners of your property? Do you know the things they want most from life and how they try to achieve them? Have you ever thought to notice what obstacles and hardships trouble their lives and how they try to surmount them? Have you ever wondered whether they have thoughts and emotions like human beings or whether they are little more than machines — or perhaps somewhere between these two extremes — and if so, exactly where? And what reasons do you have for thinking so?

Perhaps these questions have made you realize that you know but little about this abundant and interesting bird. Most persons can recognize a robin, but know little else about it. Bird students usually know the main facts in its life history and a good many minor points and other bits of special knowledge. Ornithological books, journals and articles have recorded a vast fund of information on the robin. Yet it is surprising how much of the robin's affairs are still unrecorded and unknown to science. The literature on the robin is so scattered that most bird students do not know what is on record and what is not.

The robin is so well known for its abundance about human habitations that the fact that it occurs in a variety of habitats is often overlooked. Even most bird students do not know that in much of its range the robin is one of the commonest breeding birds of the woods and forests.

In extensive studies that I have made to determine what species of birds are most frequently observed in various localities and habitats, the counts often show the robin to be one of the most conspicuous birds in forested areas as well as elsewhere. In Cortland county of central New York in the 1930's I calculated the robin to be the most abundant breeding bird in the county as a whole. In various areas of different types of woodland the robin ranged between second and twelfth (usually between third and eighth) in numbers seen and heard during June and early July, the total number of species varying from 60 to 83.

In a somewhat similar survey of the most frequently found breeding birds of Chemung and Schuyler counties, during the 1940's, the robin was third on the list for the two-county area as a whole. In various types of forest habitat the robin varied between second and seventh in numbers seen and heard in June and early July; the total number of species varied from 34 to 72.

In the wild and remote forested portion of western Quebec, the robin was second in numbers observed (after the

white-throated sparrow) during two days of bird counting. Quite different in method from the above counts was one made by nonstop driving through the wildest forested stretch of road along the north shore of the Gaspé peninsula in eastern Quebec late one afternoon in early July. In less than an hour we counted more than 50 robins, but a total of only four other birds. A friend who drove over this same road two days later told me that one of the things he liked best about that part of the trip was all the wild country without a single robin!

In many censuses that attempt to show the exact numbers of birds actually present, made by observers in other parts of the country, the robin is often, but not always, somewhat lower on the list of relative abundance. The above-mentioned studies apparently give a better idea of the relative conspicuouness and observability of the robin and other birds.

Little is mentioned in ornithological literature about robins nesting on cliffs, except in parts of the continent where there are no trees. On the little cliffs in the wooded gullies, glens and rocky hillsides of central New York, however, I have seen many robins' nests, usually on narrow ledges three to 12 feet above the cliff bases. In view of this nesting habit it does not seem surprising that robins should come to build on ledges of houses and other man-made structures. It is a simple and natural transition.

Scattered individual robins remain during winter in many parts of upstate New York more frequently than most persons realize, but often escape notice because at this season they tend to inhabit wild, dense thickets not often visited except by the most intrepid bird students.

It is not certainly known whether the first spring arrivals are usually those that will pass on farther north or those

Photograph by Lynwood M. Chace, from National Audubon Society

Blue Eggs and Pink Apple Blossoms

that will stay to nest. My only personal observation concerns an instance in which a local summer resident individual, indisputably the same male that had nested and fed there the previous summer, arrived March 8th on its breeding territory several days before any other robins were seen and remained throughout the season. It was 16 days after his first appearance before I saw more than two robins in a day — indicating that it had arrived much earlier than either the migrants or the rest of the local summer residents. This makes the case an abnormal one and hence unreliable as an indicator of any general rule.

Another interesting possibility, however, is suggested by this incident. This robin's territory of the previous season was beyond a doubt the most desirable

of any for miles around, by dint of a large constant supply of food throughout the year, specially provided nesting sites, water, extra protection from enemies, dense shrubbery giving ideal refuge for fledglings, as well as many other advantages and robins' luxuries. The obvious question arises: Might a bird migrate northward before others of its kind, with no more cause than the urge to arrive in time to lay first claim to the best breeding territory he has ever known? I have also seen evidence of such foresight among cliff swallows.

Do female robins ever sing? On several occasions in spring I have seen two birds in typical female plumage fighting and chasing each other, and at one of these times, during an interval of a few seconds in the fighting, one of them — I believe the occupant of the territory — sang several phrases of robin song. At the time this bird was singing, the one that I took to be its mate, a highly plumaged unmistakable male, perched a few feet away, at no time joining in the fight. Normally only the male robin sings. But because of the ever-present possibility of misidentifying sex in the field, it is extremely difficult to obtain accurate observations of females singing. The incident described above is the most convincing in my own experience.

Many more observations of the act of selecting the nest site are needed. I have seen good evidence that the male may select or suggest it in some cases. On the other hand, I have also seen the female, preceding the male or alone, sometimes carrying nesting material, going from one potential nest site to another, sometimes turning and squatting in the better-looking places. In these instances, however, I have not seen subsequent nests in any of the locations that I saw being examined.

I have put out strips of white cloth for nest-building birds on several occasions. Robins have accepted them eagerly and have made their nests conspicuous with these white streamers. The contents of these nests have usually been destroyed later by predators; unfortunately I do not have figures to show the percentage or the total number broken up. Various aspects of this need further investigation.

In supplying nesting material for robins, my first mud made in a dish from soil with water added did not cohere well enough for the robin to be able to carry it away; apparently the soil was too sandy. Instead the robin pulled out lawn grass by the roots where the soil was damp so that it clung to the roots. Taking the hint, I kneaded hundreds or thousands of very short, cut and dried pieces of lawn grass abundantly into the

Photograph by Allan D. Cruickshank, from National Audubon Society

The Hungry Young

mud in the dish so that the result reminded one of reinforced concrete. The robins found this irresistible and thereafter preferred it to all other sources of mud.

One can never tell when such a versatile bird as the robin may do something quite outside its usual routine. When I lived in Cortland I kept a constant supply of oat flakes in a large wooden box that rested on its side in the yard where I could watch it from my study window. When the brood of four young robins left their near-by nest, the male parent immediately took full charge of them, feeding them almost entirely on these oat flakes for a few weeks until they had learned to feed themselves. Many times a day he entered the box and stuffed the mouths of the semicircle of juveniles that gathered around him. Between feeding periods the young simply waited near the box until he returned. On the third day that they were out of the nest, another and smaller young robin tumbled in, fresh from a nest a block away — too far for its parents to find it — and very hungry. Pathetically, it pursued screamingly almost every bird that visited the feeding area, English sparrows, song and chipping sparrows, and the larger young robins of the other brood. But none recognized nor fed it. After some time it spotted the screaming but happy semicircle of four. It joined the group and was unhesitatingly fed and immediately adopted into the family.

Individual birds may differ psychologically from others. For example, I knew a female robin that seemed to be as absent-minded as the proverbial professor. Several times I saw an English

Photograph by Allan D. Cruickshank from National Audubon Society

Adolescent Dignity — At Least While They Cling to the Bough

sparrow rob her of a bill-full of insects or worms as she rested momentarily on the way to feed her nestlings. After the robbery she never seemed to realize her loss, for she always continued to the nest, usually, of course, arriving with bill empty or nearly so. Then she would either perch on the nest appearing puzzled, or go partly through the motions of feeding the young — but with nothing to feed them.

At a second nesting of this same bird a full-grown young English sparrow apparently obtained most of its sustenance over a period of several days by stealing food from the young robins in the nest. It spent most of its time close to the nest, and immediately after either adult had fed the young and flown away it hopped onto the rim. When the expectant young opened their mouths widely the sparrow reached into any mouth still holding unswallowed food and helped itself. Both adult robins ignored the pilferer and never seemed to suspect what was going on.

On the day after these young left the nest there came a sudden heavy downpour. Immediately the mother robin flew to the deserted nest and settled on it as if to brood the young. She stayed on the nest, suffering the pelting rain throughout the shower.

The peak of absent-mindedness was reached a few days later. She had just flown to her partly finished third nest to add to it a piece of cotton cloth more than four inches long and nearly an inch wide, when one of her young from the previous nest gave its hunger call across the street. She listened alertly a few moments, then leaned over to place the cloth on the nest when again came the hunger call of her offspring. Unable this time to resist, she flew to it and crammed the piece of cloth into the wide-open mouth. The youngster, of course, spit out the dry and tasteless piece of nesting material. The solicitous parent picked it up, carefully folded it into a wad, and crammed it still farther down the young one's throat. This was repeated several times until finally the frustrated parent gave up and the still hungry young one went about picking up and swallowing tiny pebbles and pieces of twigs. The cloth lay on the ground.

How frequently do such "scatter-brained" individuals occur among robins? Are they more prevalent among one sex than the other? What other interesting and unexpected things are the robins that share your lawn doing while you are not watching them?

If you would add a new enjoyment to your life, get a good idea of what is known and what is unknown about the robin by reading both of the accounts listed below and become well acquainted with some particular pair of robins that you can watch for at least a few minutes nearly every day, trying to find ways by which you can recognize them as individuals, and keeping detailed written notes. You will find that bird study takes on a new meaning and that your robins soon become interesting characters in a continued story — a drama of real life in which you will be constantly called upon to play the role of detective.

Fun? Just try it for a season!

Suggested Reading

Bent, Arthur Cleveland. 1949
Life histories of North American thrushes, kinglets, and their allies. United States National Museum Bull. 196, p. 14–66

Howell, Joseph C. 1942
Notes on the nesting habits of the American Robin. American Midland Naturalist, vol. 28, no. 3, p. 529–603

This State Takes Care of Its Trees

The Forest Practice Act Provides Assistance for Private Owners of Forest Lands

E. W. LITTLEFIELD
Superintendent of Forest Management
New York State Conservation Department

FOUR YEARS AGO — on February 28, 1946, to be exact — the State of New York placed a new kind of forestry law on its books. Forestry legislation enacted in previous years had to do mostly with state forests or forest fire prevention; the 1946 statute, known as the Forest Practice Act, deals with the cutting of timber and other management practices on private forest lands, of which there are some ten million acres in New York.

You may ask, and rightly so, why the State should concern itself with the problems of the private forest owner. Is it, you say, any of the State's business how people cut trees on their own land? The fact is that even before the Forest Practice Act became a law in New York, a number of other state governments had already made it their business to see how the private owner was treating his woods, and two states in particular — Maryland and Washington — had promulgated laws regulating rather strictly the manner in which cutting should be done on private woodlands.

What about the New York law? Is this more regulation, with police power, inspections and penalties? The answer is "No." The Forest Practice Act does not compel anybody to do anything; it does set up the legal framework within which owners may regulate themselves, and, more important, may obtain special services from the technically trained foresters of the Conservation Department.

Let's see how this program works. Under the Forest Practice Act the Conservation Commissioner has established 15 districts which take in all the State outside of Greater New York City. A district includes from one to half a dozen or more counties. A Forest Practice Board is organized in every district with representatives from each county appointed by the chairman of the board of supervisors; two out of the three county representatives must actually own woodland within the district. This group is responsible for deciding what forest practice standards are needed for the district. The standards are subject to review by a state board composed of district board members elected by their own group to represent the district and by the Conservation Commissioner. Once the standards are established, any woodland owner in the district who will sign an agreement to manage his woods in accordance with them, becomes a "cooperator."

Cooperators are eligible to receive certain services from the district foresters employed by the Conservation Department. First, the forester will look over the woodland with the owner and advise him in a general way as to the kind of forestry program that can best be undertaken — whether there is merchantable timber that can be harvested, land that needs reforestation or a young stand of

Courtesy United States Forest Service

A Fine Example of Selective Logging with a Good Residual Stand Left To Grow

Another profitable cutting can be made here in 10–15 years.

trees that would benefit from an improvement cutting.

Next, the forester makes a sketch of the woodland — called a type map — that shows how the woods are located with respect to the rest of the property and what parts of it are in different kinds and sizes of timber. From all this — the map, the observations on the ground and talks with the owner — he prepares a management plan which describes the forest conditions, summarizes the owner's objectives and specifies the forester's recommendations. This plan is submitted to the owner and, if he approves it, the forester will then give him additional help in putting the plan into operation.

One of the most important features of such assistance is what we call "timber marking." The trees that should be cut

are designated by a paint spot, an ax blaze or a narrow mark made with a special gadget known as a timber scribe or tree-marking tool. Marking calls for seasoned judgment and discrimination on the part of the forester, because he must mark not only the merchantable timber, but a certain number of the poorer trees whose presence is detrimental to the best growth of the stand.

As the forester goes through the woods marking the trees, he makes an estimate of the board feet of lumber or cords of wood that the trees will yield when they are cut. To the layman this must seem an impossible task, but here is where applied mathematics comes in. By means of simple geometric formulas, tables have been prepared which show the volume in trees of given trunk diameters and

Courtesy United States Forest Service

Results of a Clear-cutting Operation

This area will not produce any income for half a century.

heights. These volumes have even been transposed to a glorified yardstick or "cruising stick," so that the values can be read directly without tables or computations. In the actual measurement of the trees, we graduate from geometry to trigonometry, and by holding the cruising stick at a certain angle and distance from the eye, we can gage both height and diameter with surprising accuracy.

Marking trees for cutting does not accomplish anything unless the trees are cut. The chances are that they will not be unless logs or cordwood can be sold or used there on the farm. So the forester's next job is to advise the timber owner about markets. In many cases the timber can be sold on the stump at a price based upon the estimated volume of the marked trees. This is the easiest way to do it. On the other hand, there are some advantages to the owner in doing the logging himself if he has the proper equipment and "know-how." For one thing, he has a better chance to dispose of the various kinds of timber for special products, which bring higher prices, than he does if all the stumpage is sold for one lump sum. In any case, he is advised to have several buyers look at the timber before selling, and to sell under a written contract that will insure that the woodlot will be cut in accordance with the marking and recommendations.

Proper harvesting of mature timber is an important part of forestry, but it is only a part. Protection of the woodlot from its enemies is just as important, and the most deadly enemy of all is the cow. As a matter of fact, cows have probably done more damage to the productive capacity of New York woodlots in the past 100 years than have fire and lumbering put together. Forest fires and some logging jobs are in the nature of catastrophes: they are sudden, violent and dramatic, often annihilating the whole forest at a single stroke. There is nothing dramatic or frightening about a herd of black and white cows peacefully browsing through a woodlot. Yet generations of these inoffensive creatures have nibbled off the seedlings that should be growing into trees, have compacted the soil and have destroyed the leaf litter so important in the manufacture of humus on hundreds of farm woodlots all over the State. Whenever this happens the growth rate of the trees is reduced, insect enemies multiply, and worst of all, there are no saplings coming along to take the place of the old trees when they die or are cut down. This fact is so well recognized that every forest practice board has included in its practice standards something about protection from grazing. Many farmers, perhaps a majority, still feel that they have to turn the cows into the woodlot in order to have enough pasture, but cooperators under the Forest Practice Act, and others, are beginning to fence their woodlots, because they have become convinced that pasturing the woodlot is not only poor business for the woods but poor forage for the cows.

Reforestation is another aspect of the Forest Practice Act. For some 40 years the Conservation Department has been distributing tree seedlings to individuals at a nominal cost to reforest land not suitable for agriculture. The Forest Practice Act carries this principle a step further and furnishes trees to cooperators without charge, provided they are planted in accordance with the recommendations in the management plan. Already 500 cooperators have received three million trees under this plan.

How does the woodland-owning public feel about this program? The best indication is that in the four years the act has been in operation more than 6000

requests for assistance have been received, 2000 cooperators owning three-quarters of a million acres have signed agreements with the Conservation Department and new requests are coming in at an ever-increasing rate. Results like these, we believe, provide an answer to the question as to whether police regulation is needed in New York State to keep our private woodlands productive. We feel certain that this goal can be reached sooner and more realistically through the system of voluntary cooperation combined with technical assistance that is provided for under the Forest Practice Act.

◆ ◆ ◆

Let's Visit a Wildlife Sanctuary

Schools Use This Sanctuary as an Outdoor Laboratory for Study of Animal and Plant Life

ALVAH W. SANBORN
Director, Pleasant Valley Sanctuary

Photographs by the Author

PLEASANT VALLEY SANCTUARY lies nestled among purple hills in the heart of the Berkshires, in the township of Lenox, Mass., 12 miles from the New York State line and just a mile and a half off of U. S. Route 20. A sign at the entrance assures visitors that they are welcome. Some sanctuaries established for the protection of birds that nest in large colonies can be visited only by making special arrangements with the warden. Pleasant Valley is not one of these. All forms of wildlife are protected here — not only songbirds and hawks and owls, but also the foxes and their furred brothers, snakes and frogs, as well as wildflowers and other kinds of plant life.

As we pass through the gate in the old split-rail fence, we see on the right the director's residence — a fine old cottage built shortly after the Revolution. Beyond, on the left, is the barn with its splendid collection of Shaker antiques. We can stop there later and get a sandwich or cold drink if we need refreshment. Beyond the barn, rising abruptly from the valley and clothed in unbroken forest, is Lenox mountain.

Bird feeders and birdhouses are all about the entrance of the sanctuary. Even as we look, a blue jay leaves the weather-vane feeder on the front lawn and, with a flirt of its blue and white tail, disappears into a near-by thicket. Examining the feeder, we see it is pivoted on a post and has arms or vanes by which the wind keeps driving rains and snows from the open entrance. A

chickadee scolds on a branch of the great old maple over our head, and before we can step back, the little black-capped imp is helping himself to a sunflower seed.

By the side of the path is a birdhouse and from the forsythia a scolding *ch-r-r-r* warns us that we are intruding. With rapidly beating wings, a wren springs from her place of concealment and mounts to the top of her house. Her tail is cocked at a jaunty angle as she walks jerkily about on the roof. She scolds us, peers this way and that and then tumbles over the edge and pops into the open doorway. Raucous screams from within tell us that hungry young birds are being satisfied.

Across the path on the window of the cottage is a feeding station. A fat gray squirrel there helps himself to bird food. A downy woodpecker busily removes peanut butter from the holes drilled in a stick hanging from the lilac.

Another visitor stops to talk with us. He is a sanctuary member and makes us welcome. He tells us that one of the most important things to be done about a sanctuary is to make it a better place for more kinds of wildlife to live. They can not know it is a sanctuary, for of course they can not read the no-hunting signs, but they know when a place is a good spot to live in. This man notes that feeding stations have been erected and berry-bearing shrubs have been planted all about the cottage and in the numerous hedgerows. These provide not only food but good cover into which the birds may dart for shelter from their enemies. Birdbaths are placed here and there for drinking and bathing, and nesting boxes are set out over a large area.

The biggest improvement for wildlife was made 17 years ago when three beaver from Bear Mountain Park were released on Yokun brook, which flows through the valley. When the sanctuary was first

Gail Sanborn Is Her Name. The Robin Is Her Friend.

founded, 20 years ago, there were no ponds, so there was no place for birds like wood ducks, bitterns and red-wings to live. Since then, the beaver have made a great many dams and some of the ponds are very large. Cattails have grown in, and now there is a perfect habitat for water and marsh-loving birds. "Two years ago," our new friend says, "there was a big flight of beautiful egrets from the South. Four or five of them fished the beaver ponds for several weeks and once a flock of 17 passed up the valley. The beaver themselves are interesting animals to watch, but if you want to see them you should come some evening just about sundown."

"Excuse me," I interrupt, "but that bus load of boys and girls at the entrance — isn't it unusual for buses to come over this back road?"

"No, indeed. In the spring boys and girls from most of the schools in Berkshire county use the sanctuary as a sort of outdoor laboratory for field study in their course in natural science and conservation. Schools and clubs from Albany and Schenectady also visit the sanctuary. During the summer many camp groups come to take field trips with the sanctuary's director." A sanctuary as an outdoor laboratory — this is a new idea.

Before taking our leave from this courteous stranger we ask where to go first. "I suggest that you go down the path to the trailside museum. You'll want to see it, and all the trails start at that point." We thank him and start off.

The trailside museum is a low building at the edge of the field with a number of very large windows. Its outer walls are covered with wavy-edged boards stained a rich brown. As we enter we see the north end of the building with its enormous stone fireplace in the center and on either side great windows reaching from the bookcases to the peak of the roof. All this window space makes the building very light and pleasant.

Straight in front of the entrance is an exhibit of excellent bird paintings; a sign says that next week there will be an exhibit of wildlife photographs. In front of one window is the aquarium. On the next wall panel are electric naming games with a sign, "What is your I. Q. in nature?" We each take a pointer and try our hand at identifying birds and flowers; when we get the right answer the light blinks to tell us so.

Across the hall a beaver exhibit tells all about how beaver live. There is a mounted beaver, real beaver cuttings and a model of the ponds. We come next to the kodachrome exhibit. You turn the handle, and as the picture comes up you see if you can tell what it is. The answers are on the side. In the center of the hall are cases containing collections of minerals, birds' nests, insects and cut flowers. One of the most unusual exhibits is the collection of live insects. Right before our eyes a praying mantis catches a grasshopper and eats him. A monarch butterfly comes out of its pale green chrysalis and the slowly pulsating wings grow as we watch.

The museum has a small wing and though we do not enter, we can see the boys and girls of the sanctuary's Nature Day Camp. They are all busy making plaster casts of a beaver's track. One of the boys says that they come by taxi every day for two weeks. They go out into the woods on hikes, around the ponds and up the mountain to the fire tower. They watch birds and animals, catch specimens for the aquariums and collect and mount insects. Near the end of their two-week session they will have a night meeting to see the beaver and call the barred owls.

The museum alone could keep us busy all day but we want to go out on the trails. On the map outside we read that the sanctuary covers almost a square mile and that there are over eight miles of trails! One trail goes to the beaver ponds, another to Farviews — which the map shows is a lookout at the top of the mountain — and still others follow the several brooks. There are so many trails! The Nature Trail catches our eye. It is one of the shortest, too.

As we start down the path we go only a short distance before we come to a small wooden sign. A picture of a goldfinch is painted on it, and we read that the goldfinch is often called the wild canary and that it can be recognized at a great distance by its peculiar bounding flight. At the edge of the field a beautiful tree swallow hovers over its nest box, and as it comes to rest at its front door,

Young Campers Make Terrariums in the Trailside Museum's Workshops

its metallic blue-green back flashes in the sunlight. Its beak is stuffed with insects. A sign says that these birds return year after year to the same place.

Over the hill now we pass through a field of goldenrod. Many of the goldenrod stems have a round green swelling beneath the budding tops. A sign explains that a tiny fly known as a gallfly caused the swelling by laying its egg in the stem.

Standing at the edge of Pike's pond we watch a flock of handsome mallards swim boldly up. A little boy throws them some grain and the ducks tip up — that's the way they feed. They don't dive, but pick food off the shallow bottom. The females lack the bright green heads and light gray backs of the males. They are brown — perhaps that is Nature's way of hiding them when they are sitting on their eggs.

Over on the bank is a three-leaved vine and a sign reads "Leaves three. Quickly flee. POISON IVY." We "flee" down the trail, across a babbling brook and into the woods. Here are beautiful paper and yellow birches, ash trees and maples. On the forest floor we see ground pine, bracken fern, partridgeberry. Signs tell about these trees and plants — what they are, what use man makes of them and of their own place in a woodland community. Suddenly a bird calls loudly, *teacher-teacher-teacher-teacher*. A sign conveniently placed shows a picture of the bird. It is called an ovenbird because its nest is open on the side, just like an oven.

We cross another bridge and walk through a pine woods where the needles make a carpet on the trail. Under a huge spreading maple is a wonderful fern garden. All kinds of ferns — little ones,

Day Campers at Pleasant Valley Collect Specimens for the Museum's Aquarium

big ones, dainty and coarse. Suddenly we find ourselves back at the edge of the pond and here are the ducks again to beg more food. At the water's edge an apple tree has been cut down. Has someone forgotten that this is a sanctuary? But no ax cut this tree. A sign asks, "How many teeth did the beaver use to cut this tree?" A pull of the string turns the sign over — "The beaver used four teeth — the gnawing teeth which make all members of the rodent family look as though they have buck teeth."

Now we leave the pond's edge and turn up through the gray birches. A ruffed grouse flies up with a muffled roar of wings. A catbird cries his annoyance and alarm from the blackberry tangle; a chipmunk scampers into the stone wall on the left. Rabbit scats are evident everywhere. A sign with rabbit tracks painted on it arouses our curiosity. We raise the hinged cover and read that rabbits like the old briar patch especially for the protection it offers against such enemies as foxes and hawks.

Around the corner we see a cage of snakes and a man there asks us if we would like to hold a milk snake. He picks it up and handles it gently. That gives us courage. It's fun to hold the snake and it isn't a bit slimy. The man says the milk snake doesn't do any harm at all. Instead it helps us by killing mice and baby rats. He says that they keep a few snakes in captivity so that they can teach people not to be afraid of them.

Our time is up. We have to leave and we haven't even been to the beaver ponds or seen half of the interesting things. We'll have to come back. Pleasant Valley is certainly a good name for this sanctuary.

Wild Plants Thrive in Rock Gardens

Provided Natural Conditions Are Duplicated Before They Are Transplanted

FREDERICK HOUGHTON
Research Associate in Horticulture
Buffalo Museum of Science

IF YOU HAVE a rock garden, as you probably have, or if you plan to have one, as you probably will, you should know that the northeastern corner of America provides a large number of wild plants that are exactly fitted by nature to grow in it. You should also know that many of these are more beautiful than those which are so alluringly pictured in nursery catalogs and, besides, are much more apt to succeed in your garden.

There are two quite distinct groups of these plants. One group demands for proper growth a limy soil, alkaline in reaction, the other a soil lacking lime, and acid in reaction. If you plan to use these wild plants you must keep this difference firmly in mind, for if you transfer a plant from one of these types of soil to the other, you may coax it and coddle it without end but it will fail to thrive, or even to live.

Limestone and dolomite rocks underlie a wide area reaching from central New York westward around the western end of Lake Ontario, thence northward toward Georgian bay. In some localities these rocks lie on the surface in wide flat sheets which are scarred by fissures and cracks, the result of weathering. In other places streams cross their escarpments and have cut deep gorges. All these rocks and the soil derived from them are limy with an alkaline reaction, and the fissures, the talus at the bases of cliffs, and especially the deep, moist, shaded gorges, provide favorable conditions for the growth of abundant lime-loving plants.

You can find a typical group of these plants in a gorge which the Sydenham river in Ontario has cut where it crosses the Niagara limestone. The air in the gorge is constantly moistened by spray from a fall at its head, its walls are almost perpendicular and its bottom is littered with huge limestone blocks. Charming little rock ferns, the maidenhair spleenworts (*Asplenium Trichomanes* and *A. viride*), cling to the steep sides of the blocks and with them grows the taller, graceful ebony spleenwort (*A. platyneuron*). In the mosses which cover the talus you will find the walking fern (*Camptosorus rhizophyllus*), which steps along by forming new fronds at the tips of the old ones, and the hart's tongue fern (*Phyllitis Scolopendrium*), unique among ferns by having long tongue-shaped fronds without the usual delicately cut divisions of the other ferns. Among the blocks grow the bladder fern (*Cystopteris bulbifera*), most elegant of ferns, and the other *Cystopteris*, the frail and delicate *C. fragilis*, which in spite of its seeming frailty is so hardy that it grows on the edge of the Arctic ocean. Another hardy species, the holly fern (*Polystichum Lonchitis*), grows amid the rocks both here and in Labrador.

All these ferns can be transplanted successfully, except the hart's tongue, whose environmental requirements are

Photograph by Frederick Houghton

New Jersey Tea, a Neat Little Shrub, Does Well on Sandstone Rocks

not well understood. In no case should this fern be removed from its own habitat since it occurs in only a few scattered areas and its continued existence is precarious. The New York State wild flower law prohibits its removal from any natural location in this State. It also prohibits removal of any ferns from state lands, parks, highways or other public places.

In many locations the limestone lies on the surface open to the sky. It weathers into deep fissures and cracks which fill with gritty, limy soil. Wherever such conditions occur you will find abundant lime-loving plants. Two diminutive violets root in the cracks — the ovate-leaved violet (*Viola fimbriatula*), which is purple flowered, and the wild pansy (*V. Rafinesquii*), along with tight tufts of fringed houstonia (*Houstonia ciliolata*) and gray-leaved early saxifrage (*Saxifraga virginiensis*). In summer the gray rocks flame out with red columbine (*Aquilegia canadensis*) and blazing orange butterfly weed (*Asclepias tuberosa*). Harebells (*Campanula rotundifolia*) perch on the raw edges of rock, and Kalm's St-John's-wort (*Hypericum Kalmianum*) thrives in the crevices of the limestone where the ledges slip under the waves of Lake Erie. All these plants are essentially rock plants and all will succeed in your rock garden.

Granitic rocks underlie a great part of New England and northern New York, but southwestern New York is a region of high hills capped by sandstone and conglomerates. The soil derived from these rocks is apt to be acid, in many places extremely so, and much of the vegetation there is fitted to tolerate this acid soil.

You will find a typical group of acid-loving plants at the Salamanca "Rock City," one of several outcrops of con-

glomerate in southwestern New York. A road which follows the base of an escarpment along the top of a high hill above Little Valley, New York, at an altitude of 2300 feet, is bordered on both sides by the varied vegetation of the acid rocks. The conglomerate has weathered into immense rectangular blocks which are tilted into sharp angles and are separated by deep but very narrow clefts. A talus of sharp, acid, siliceous sand borders their bases, and in this and on the sides of the blocks there is a lusty growth of the larger ferns — shield ferns, spleenworts and Christmas ferns. Mats of polypodium cover the tops of imposing rocks and drip over the edges into dark fissures, carrying with them tufts of long beech fern (*Thelypteris Phegopteris*). Clubmosses of several species form dense mats over the talus; one (*Lycopodium annotinum*), being notable as a characteristic alpine plant of the Adirondacks.

Conspicuous among the flowering plants is trailing arbutus (*Epigaea repens*), the Mayflower of the Massachusetts granites. Its leathery foliage and fragrant pink flowers should make it a desirable rock garden plant but it is difficult, even impossible, to transplant. A few nurserymen sell seedlings which may survive. Two species of gentian grow in the talus at the base of the escarpment — one the funnel-shaped blue *Gentiana quinquefolia*, the other the

Photograph by Frederick Houghton

A Natural Alpine Rock Garden Near the Summit of Mount Washington

beautiful blue-flowered bottle gentian (*G. clausa*). You may find an occasional orchid on the rocks, but of these only a few will survive removal. Moccasin flower, the lovely pink *Cypripedium acaule*, grows sparingly on the rocks. Most delightful of the smaller orchids is the *Microstylis unifolia*, which spreads into scattered colonies in humus above the conglomerate. Staunchly it holds aloft to the height of three full inches its one small leaf and its diminutive tuft of very small green flowers. It must be borne in mind, however, that the trailing arbutus, all the cypripediums and two of the gentians are protected by state law. No one should remove these or other uncommon plants from their native habitat. Strict voluntary preservation of our wild flowers is of course in the interest of all citizens now and for the future.

Two tiny violets snuggle into the deep moss amidst the talus: *Viola blanda*, the small sweet white violet, and *V. rotundifolia*, with large round leaves and yellow flowers. Both are charming. Other small plants serving as cover for the raw rocks include *Dalibarda*, *Coptis* — collected for medical use as goldthread, and *Maianthemum*, which resembles a small lily of the valley. All these bear white flowers and spread by underground runners to form wide colonies.

Where the granites of New Hampshire and New York heave up into the White mountains and the Adirondacks, the soil is acid, but owing to the cold and moisture on the summits, the vegetation is quite different from that at lower levels. A typical group of these alpine rock plants borders the excellent automobile road which leads to the summit of Mount Washington. The Greenland sandwort (*Arenaria groenlandica*), a fragile but hardy plant, and *Potentilla tridentata*, both bearing white flowers, spread in dense masses over the wet rocks. A low early-blooming goldenrod (*Solidago Cutleri*) rises but a few inches from the talus. *Lycodium annotinum*, which tolerates the climate of lower levels, is the clubmoss characteristic of these high altitudes, but *L. Selago* is confined to the summit. Over and through these rock covers creep the thin stems of a low trailing shrub, *Empetrum nigrum*, the crowberry, whose small leaves will deceive you into thinking it a lycopodium. Mats of the red-berried mountain cranberry, *Vaccinium Vitis-Idaea*, conceal flat rocks, and to your surprise you will discover that a prostrate little shrub half buried in moss is a willow, *Salix Uva-ursi*.

When you have planted in your rock garden any of the plants mentioned in this article that may be collected legally and by permission of the landowner, you may feel confident that they can succeed there, for every one has thrived for many seasons in gardens where they have been tried. You can buy certain kinds from nurserymen, some of whom are very circumspect about not robbing the wild to replenish their stocks. Other kinds, no less beautiful and interesting for being common, afford the pleasure of one's own collecting. All are confined to particular types of soil, but these soils and the plants which they support are widely distributed, and you may reasonably expect to find the plants you desire in the locality nearest you where their type of soil exists.

But before you dig them be sure that you have made ready for them a proper place, with soil as nearly as possible similar to that in which they were growing. If you have not done this, it will be much more considerate to leave them where they are. Too many lovely wild plants are dug by eager enthusiasts, carried home carelessly in the back of an automobile, and next week dumped into the trash can!

Birds near the New Jersey Border

Some Recent Changes in the Bird Life of Rockland County, New York

ROBERT F. DEED
Field Secretary
Rockland Audubon Society

OUTSIDE THE COUNTY of New York, there is no smaller county in the State than Rockland, 183 square miles of suburban and rural countryside tucked into the junction of the Hudson river and the New Jersey border. Rockland county is a triangle with its points at the Palisades on the south, the Ramapos on the west and the Hudson highlands on the north. It is mostly included in the Ramapo and Tarrytown topographic maps issued by the United States Geological Survey.

In this triangle, small as it is, we find the meeting ground where Canadian and Carolinian species of birds intermix. The result is a wide variety of bird life. Topography, rather than latitude, seems to be the controlling influence in bird distribution in this area. On its southern exposure Rockland county runs to slightly rolling country, its valleys leading down into New Jersey with a series of creeks and brooks. This rolling land, with ridges running mostly north and south, continues northward to the High Tor ridge and the mountains west of Stony Point. These highlands, averaging only a little over 1000 feet above sea level, form the end of the blind alley which southern birds follow in their drift up from New Jersey. It is there, too, that one finds the factor of altitude working most dramatically.

My one favorite trail, northwest from Lake Tiorati in the Harriman-Bear Mountain section of the Palisades Interstate Park, takes the hiker in 15 minutes from the nesting ground of the worm-eating and hooded warblers, through the bogs favored by the Canada warbler and up a few hundred feet (to about 1300 feet elevation) to the breeding ground of the brown creeper and the Blackburnian warbler.

I have been keeping bird records in Rockland county for about 20 years, and in that time I have witnessed the phenomenon of a generally steady northward extension of the breeding range of some Carolinian zone species. In those mere 20 years the tufted titmouse, the cardinal and the turkey vulture have become common breeding birds in most of Rockland county; the Carolina wren, too — but that's a special case, to be described later.

In the same period there has also been a marked increase in numbers of laughing gulls, double-crested cormorants, little blue herons and the American and snowy egrets. In the case of these species it is not a matter of northward extension of breeding ranges but of a general increase along the Atlantic coast. Before discussing the breeding birds acquired from the South, I would like to call attention to some earlier appraisals of these species.

E. A. Mearns, in notes recorded up to 1890 in the Hudson highlands, called the laughing gull an occasional winter visitant. This sounds dubious today

Photograph by Weitner Aerophoto Service
Courtesy Palisades Interstate Park

The Palisades, Where Duck Hawks Nest on the Cliffs and the Carolina Wren Nests along the Shore

since the bird is least common in winter. Ludlow Griscom's notes for the Hudson valley in 1923 remarked that this gull was becoming common; today it is common. In summer and fall it far outnumbers the herring gull along the lower Hudson. Mearns likewise reported only two records for the double-crested cormorant up to 1890. I have seen as many as 14 in one day between Nyack and Tarrytown.

It is well, too, for conservationists to recall how the white herons have made a comeback. Griscom's Hudson Valley list in 1923 rated the little blue heron as casual, the American egret as having been recorded only seven times up to September 1921 and the snowy egret as extirpated — just that, extirpated! During the past three years the Rockland Audubon Society has seen as many as 35 little blue herons and an equal number of American egrets in one day on the Hackensack creek, and the snowy egret has been observed at least once in that time.

The northward march of breeding species is probably more significant in the Rockland County picture. The tufted titmouse, cardinal and Carolina wren have kept pace in this movement. In 1930, when I was afield extensively, I knew these birds mainly in the Englewood and Alpine regions of Bergen county, New Jersey. The titmouse was established only along the southern fringe of Rockland county, the cardinal very sparsely along the Hudson and the Carolina wren not at all in our county.

Frank Chapman's list for the New York area in 1894 regarded the tufted titmouse as a local resident only on Staten island, 40 miles south of our county. Today it is widely distributed — as far north as the Hudson highlands where there have been only four records, all in 1934 and 1935. Our Janu-

ary 2, 1950, winter bird count by the Rockland Audubon Society noted 94 titmice compared with 579 black-capped chickadees. The difference is usually less. That the Hudson river has retarded the eastward spread of the titmouse seems to be demonstrated by the fact that John F. Kuerzi's review of the Greater Bronx Region, about 1927, showed only six records from 1874 to 1924. The titmouse was a common bird in Rockland county by 1935.

Griscom's 1923 notes for the Hudson valley reported the cardinal as nearly extirpated. L. W. Brownell's Rockland County list in Eaton's Birds of New York, showed the cardinal as only an uncommon breeding resident up to about 1908. In 1930 I knew of one pair in Nyack. Today I can count at least three pairs within a few blocks of my home, and the cardinal has become almost abundant all over the county, except in the Hudson highlands. The Rockland Audubon Society counted 35 in its 15-mile circle in last winter's count and 43 the year before. Again, the Highlands seem to be a barrier with only a few scattered records north of Jones Point. I know that the cardinal has by-passed those mountains, however, and occurs much farther up the river in suitable suburban sites.

Photograph by Allan D. Cruickshank, Courtesy National Audubon Society

The Cardinal

Photograph by Allan D. Cruickshank, Courtesy National Audubon Society

The Turkey Vulture

The turkey vulture, too, is an authentic immigrant as a breeding bird. I saw my first vulture in Rockland county on March 30, 1930. In 1934 I saw one flock of eight near Bear mountain, and a relief worker on a highway project in that area found a fledgling, not long out of the nest. In 1935 I recorded 36 vultures; in 1936, 161 vultures including one flock of 30. The 1940 Bear Mountain

Photograph by J. Boland, Courtesy Palisades Interstate Park

Lake Tiorati in Palisades Interstate Park. Canada and Blackburnian Warblers Nest in Near-by Hemlock Woods

Trailside Museum check list notes that the vulture was then becoming more common every year.

Finally, the special case — the Carolina wren. According to Brownell's list, up to 1908 it was a rare resident in Rockland county. Griscom in 1923 called it an irregular resident in the Hudson valley, noting that it had become scarce since the severe winter of 1917–18. That amendment gained meaning in my own observations from 1930 to 1936.

I first became acquainted with the Carolina wren as a rather rare resident along the foot of the Palisades in New Jersey, opposite the upper end of Manhattan island. In the early 1930's, however, it crossed the New York State line on its northward march. Skipping past Nyack with a pace noticeable from year to year, it established itself along the river edge as far as Haverstraw by January 1936. A few were even reported from the Bear Mountain area.

That was the high-water mark, for in late January and February of 1936 there came a series of severe snow and ice storms accompanied by bitter cold. The Carolina wren simply vanished. To this moment we have not found a single specimen in Rockland county, although they have been found once again five or ten miles farther south along the Palisades in New Jersey. Are they again working their way northward, as they did after the 1917–18 winter mentioned by Ludlow Griscom? We certainly hope so, for we miss them.

◆ ◆

Leaflets Available

Single copies of the cover picture of red-winged blackbird, with descriptive account, are available as leaflets from the New York State Museum, Albany.

Learn To Live Out of Doors

Native Materials, at the Doorstep of Camp, Are Best for Teaching

ELLSWORTH JAEGER
Curator of Education
Buffalo Museum of Science

SINCE THE BEGINNING of his history man has lived out of doors; it is for a relatively short era that he has lived in the artificial environment of cities of his own making. Biologically then, man is an outdoor animal, created to breathe the fresh air, to be exposed to the sun and to eat the fruits of the earth.

Millions of dollars are spent annually, millions of children and adults go to camp and otherwise participate in outdoor recreation to renew their tryst with Nature. This is a pact which man must keep — or become a weak parasite in the synthetic world of his own making.

We must do more, however, than to take man back to the out-of-doors; we must show him again how to live in his natural environment, how to enjoy and understand it. Common highlights of the urban dweller's venture back to Nature are sunburn, poison ivy, mosquito bites, and ants in the salad dressing. In this age of apartment dwelling, electric lights, delicatessen shops and janitors, the city dweller has little knowledge of the fundamentals of outdoor living, of fire making, of the use of the ax and knife and the making of outdoor beds and shelters, of how to recognize foods or poisons in the fields and woods.

Some 20 years ago in New York City, I heard Ernest Thompson Seton make a stirring plea to give our city dwellers a taste of the outdoors. A wealthy philanthropist in the audience was so interested in this idea that he chartered a steamer and brought 100 lower East-side boys to his beautiful woodland estate in the Catskills. When they arrived he turned them loose in the woods and told them to have a good time. A few hours afterward, when he looked up the boys, he found them sitting around, shooting crap, playing cards — and asking each other why this old crackpot had brought them to this forsaken wilderness. Then the generous gentleman realized it was not enough to take human beings from the city back into the out-of-doors; it was also necessary to show them how to live there and how to enjoy it.

Today at Life Camps, directed by Dr L. B. Sharp, we find boys and girls from the same environment as the East-side boys of 25 years ago, but these youngsters have the time of their lives living in the open, constructing wikiups, tepees, lean-tos, cooking their meals over an open fire, building clay ovens, making themselves comfortable with the things they find in the woods, finding the fullness of life in the song of birds, in the smell of wood smoke, in the quiet of the woodlands and in the joy of creating things. They find there a richness and a simplicity of life that only Nature can give and that will live with them all the days of their lives.

We are well aware (or are we?) of the gifts that can be found only in camp life. Yet we often deliberately try to make camp as synthetic as the city from

which the campers came by bringing to camp the sports of the city playground, craft kits that teach no creative lessons, the college science laboratory and the drama of Hollywood and Broadway. In fact, I recently heard a professor of education state that the only way to teach nature study was through the use of movies. He evidently had never realized the joy of real outdoor adventure, the thrill of seeing living things, the mystery and enchantment of Nature's trails. In other words, he preferred painted strawberries to the sweet tang of the real fruit.

There is an old saying that there is a time and place for everything. Camp lore should be the major activity in camp. If you want something else, why go to camp? It does not seem logical to bring people miles from the city into beautiful woods and fields only to spend their time doing the things they would do if they had stayed at home in the city. It is easier, of course, to organize a baseball game, with which every child is familiar, than to teach the mysteries of the fields and woods. It has always seemed to me that the woodlands hold such a wealth of things to do, and of inspiration, that the camper's entire stay in camp could be profitably absorbed just in the projects of camping without using activities of city origin.

Just how can we relate nature and the things of nature with the camp program? We can go back to the Indian and his knowledge and skills in outdoor crafts. We can go to our pioneer grandmothers and grandfathers, who learned much from their Indian neighbors. We can devise ideas and skills of our own that are related to the outdoors.

Only by becoming acquainted with Nature's creatures and the things of Nature, can we become conservation-minded. When we realize that our wild plants and trees can be used in the making of hundreds of useful things, we become conscious of their value. When we see the interrelationship of insects, birds, flowers, rain, clouds, sunlight and trees, we learn that we can not destroy one without affecting the others. In fact, living in camp can teach us to respect and to protect our forests, our waters, our wildlife and all natural resources so that floods, dust bowls, devastated forests and the extinction of Nature's creatures will not, in turn, result in our destruction.

Each department in camp should be related to the others in the outdoor theme. The swimming instructor should know something of the aquatic life about him so that he can call the swimmers' attention to frogs, turtles, water plants and insects, suggesting that they see the nature counselor for more information. The nature counselor should be acquainted with the craft possibilities of raw materials observed on the nature hikes, while the craft counselor should know what can be used in nature for the making of craft articles. Throughout the whole camp organization, the program can be entirely related to the out-of-doors and its opportunities. Camping should build self-reliance — knowing how to take care of one's self in the woods with a minimum of equipment creates self-confidence.

Camping skills need not be elaborate. The sharpening of an ax and knife is a sadly neglected activity in camp yet it is very important to the camper. Knowing how to combine a few pine needles or scraps of bark and fuzz sticks, and how to split kindling for fire building, is more important as a camp craft than boondoggling or the making of airplanes from kits. The making of snowshoes, of a canoe paddle or a hickory ax handle has

Photograph by John Heller

Children at Bugbee School, Onconta, Made This Indian Corn Grinder by Burning Out a Pine Log

practical possibilities for arts and crafts; it also teaches a knowledge of Nature's materials.

Many a profitable hour in camp may be spent in gathering milkweed, Indian hemp, nettle or the inner bark of a fallen basswood and with these making Indian cordage from fish lines to lariats. Think of the fun of making a whistle from a thin willow or red maple twig to imitate

the white-throat's song! A piece of soft wood, split, with a thin piece of birch bark stretched across the split parts will make a muskrat call. The making of animal calls develops an interest in the voices of Nature and in the creatures themselves.

It costs little to make flint arrowheads and knives and it is a fascinating camp craft. Campers will have more fun with a log raft or catamaran which they build themselves than with expensive sailing craft. Let them make their own shell spoons, broiling sticks and pothooks, for these are good camp crafts. And think how handy a pack frame can be for the next overnight hike; the campers must know how to distinguish hickory, ash or willow to gather the raw material for it.

Go on a hunt for a dead basswood, balsam or cedar tree to chop out fire sticks and make a fire. A fallen birch with its bark intact offers material for a hundred projects. Spoons, cups, baskets, lanterns, purses, hatbands, moose-calling megaphones, snow glasses, picture frames, lamp shades and numerous other articles can be made from the bark of the canoe birch. Even the woody fungi offer craft possibilities. Some kinds of shelf fungus can be made into candle holders, lamp bases and book ends.

The making of camp furniture and furnishings by the campers should be encouraged. Pioneer stools, trencher tables, candle floor lamps, coat trees, candle holders, chairs, benches, cupboards, cabin and stair railings and even pioneer shakes or shingles can be made from raw materials found all about camp and in the woods — but the boys and girls must be taught how and where to get these materials without marring the beauty of the woodland. There is a lot of fun in tracking animals and making casts, drawings and photographs of the tracks.

The answer to real camp programs is proper training of leaders in courses presented by experts who know the woods and fields, who have imagination, skill and inventiveness, who can make the lore of the past fit into the present, who have the power to make things interesting and yet simple so that leaders may get the most from these sessions. But every training program must be one of active participation, for without this no course of study will be successful.

Courtesy Buffalo Museum of Science

A Nature Study Group Starts On a Field Trip

The Forest and the Soil

Foresters Point Out the Need To Conserve and Restore This Great Heritage

SVEND O. HEIBERG
AND
DONALD P. WHITE
State University of New York
College of Forestry, Syracuse

IT IS ALMOST 500 years since knowledge of the existence of the Western Hemisphere stimulated exploration of this "New World." Although accurate scientific records of the composition and distribution of natural vegetation in the New World are meager, the early explorers' reports indicate that practically all the land in what is now the eastern part of the United States was covered by forests. For more than a century and a half following the discovery of this continent, the great area of forest soils, which were to play such a vital part in the development and wealth of the new nation, remained practically untouched by the white man. Minor clearings in this vast forest area had probably been made by the aboriginal Indians for small, primitive croplands. It is unlikely, however, that these hunting tribes with their extremely crude agriculture and low population density made any major impressions on the vegetational pattern.

Forest fires started by lightning or by Indians, and other natural catastrophes such as hurricanes, ice storms and insect epidemics destroyed smaller or larger parts of the forest temporarily or changed its composition of species for a time. On these openings and clearings pioneer tree species such as aspen and paper birch will germinate and grow. The pioneer trees will come first on open and burnt areas because their seeds are very light and can be scattered far by wind. Moreover aspen, birch and other pioneers have the ability to get started and to develop on soils that are bare and low in organic content, and they can grow in open unprotected areas under adverse climatic conditions. As these pioneers develop into a forest, the microclimate under their canopies changes in a favorable manner. Wind effects are greatly ameliorated, and temperatures do not reach the extremes that they do out in the open. Even more important, the annual leaf fall together with the lessened wind effect helps to keep the surface soil moist, providing suitable conditions for germination and root growth. Seeds of other species are brought in by wind and animals, and as the organic matter of the soil increases it gradually becomes possible for trees that are more demanding as to protection and soil conditions to become established and develop.

Most pioneer species are fast growing in youth and rather short-lived. They readily give place to the second generation, which then again improves the growing conditions for even more demanding species with respect to protection against climatic extremes and adverse soil factors. In this way, through successions of gradually more and more demanding species, the forest works toward a composition that includes those elements which are most demanding and most capable of growing under the given conditions. The culmination of this eco-

logical succession — the climax forest — may never be reached. Several centuries may be required to go through all the necessary stages, and another catastrophe often occurs in the meantime which sets the forest all the way or part of the way back to the open conditions. Pioneer species must then begin all over again to improve gradually the microclimate and build up the damaged soil.

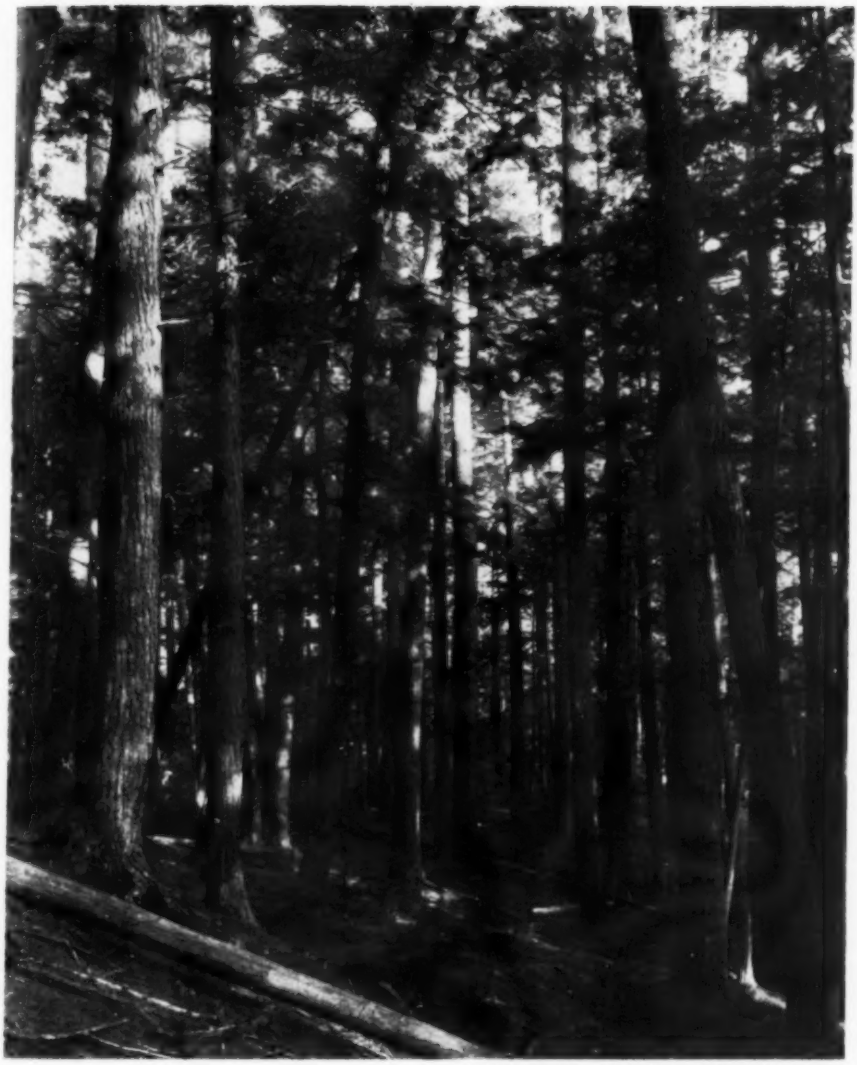
The soil which supports a virgin forest is the product of a great many processes. Its genesis results in the transformation of inert geological parent material into a dynamic living body which literally teems with life. First we have the mineral material weathered from bedrock or, as is the case with much of the mineral soil material in New York State, brought in by glaciers, postglacial streams or, sometimes, by wind.

The mineral soil, which is composed of particles of sand, silt and clay in various proportions, is the source of all the mineral nutrients necessary to sustain plant life, except nitrogen which is derived from the air. It usually contains sufficient quantities of these nutrients to sustain the needs of a forest vegetation for many thousands of years. At the same time most of these nutrients are tied up in an unavailable form and become available for absorption by plant roots only through chemical actions stimulated by soil organisms, the carbonic acid excreted by the plant roots and the presence of organic material.

On this mineral material or mixed in with it is the organic matter supplied by the vegetation. This, as mentioned, consists in part of the annual leaf fall, dead branches, logs from wind-fallen trees, dead roots and other residue from the forest. In addition to this surface litter, the roots of the forest plants which are active throughout the year supply annually a large amount of organic matter to the soil. A single plant may have several hundred miles of root hairs — these fine thin-walled extensions of young root cells through which the plant assimilates water and nutrients. The soil is host to a varied and extremely numerous population of plants and animals ranging from ultramicroscopic forms to the familiar mushrooms and field mice.

In order to sustain the activity of this "living phase" of the soil, the organic remains on the forest floor are partially consumed as food; the residue is called humus.

The total organic material in a forest soil will consist then, in part, of leaves and other vegetational residue newly fallen to the ground, and the more or less decomposed organic material called humus. Forest humus may either be lying as a carpet on the surface of the mineral soil or it may be mixed more or less intimately with the upper six or 12 inches of the mineral soil. The amount of humus and the form in which it is found is of the utmost importance to the fertility and the water relations of the soil. Fresh organic matter contains all the elements needed for plant growth. As decomposition proceeds the forest humus which is formed serves as a storehouse for nutrients which are released in forms usable for new plant growth. The natural humus of the forest greatly facilitates the intake of precipitation and thus reduces or almost eliminates soil erosion. Moreover, when humus is mixed with the mineral soil the aeration of the top soil is greatly increased and the general physical condition or structure is improved. This permits deeper penetration of the roots, favoring not only greater resistance of the trees against windthrow but also a larger volume of soil available for the tree roots from which nutrients and water may be absorbed.



Courtesy New York State College of Forestry

Virgin White Pine and Hemlock in Pack Forest, Warrensburg, Preserved as a Natural Forest Museum

In soils well supplied with humus, the micropopulation reaches astronomical proportions, even to a billion or more individuals in a single gram. Among these microorganisms are a special group of bacteria which can utilize the inert gaseous nitrogen of the air and convert it into forms usable by higher plants. Many different organisms are active in the process of breaking down organic matter and releasing nutrients for re-use by the forest, but the most vigorous in

many of the New York forest soils are the earthworms. In one acre of rich forest soil there may be as many as one or two million of these small, useful animals. They live mostly in the uppermost six or eight inches of the soil, where they mix the organic matter with mineral soil and do an excellent cultivation job.

Earthworms eat both organic matter and mineral soil and place their excreta on the top of the ground. Where there is an abundant earthworm population as much as 15 tons per acre of these castings may be placed on the soil surface every year. The work of earthworms is exceedingly beneficial in maintaining and improving the fertility and the physical characteristics of forest soils. The numerous galleries that the worms drive through the soil make it more porous so that air and water may penetrate easily into the subsoil. In addition the earthworm castings increase the fertility of the soil by converting organic residues into a more usable form.

Organic matter, and the fauna and flora that depend upon the presence of organic matter, is therefore of the greatest importance in determining the quality of the soil. A mineral soil low in organic matter can not support as rich a forest as the same kind of mineral soil with an abundance of humus well mixed throughout its upper part.

Generation after generation of forest has gradually built a fertile soil out of the raw mineral material which was left as a mantle over the bedrock after the Ice Age. No wonder therefore that the pioneer farmers could produce good crops on soils that today are considered definitely submarginal for farming. To the early colonist the forest was an obstacle to be conquered; it sheltered his enemies and resisted his plow. In clearing the forest, the pioneer may have used some of the logs but burned the rest

Courtesy of the Author

Forest Humus May Be Mixed with the Upper Six or 12 Inches of the Mineral Soil

together with all the slashings. Only in a few cases, however, did he burn the bulk of the forest humus. Humus mixed with mineral soil can not burn, and humus lying on top of the mineral soil burns only when it is very dry. Ashes, humus and mineral soil were then well mixed through plowing, and for a number of years the farmer had a rich soil that needed hardly any fertilization. He had not only plenty of available nutrients but he had also an excellent storehouse, namely the humus, to prevent the nutrients from being leached away by rain.

By such continuous extractive farming, however, available plant food will gradually be used up, the humus will decompose and the soil fauna including the earthworms will disappear. Light sandy soils are easily depleted of their store-

house of available nutrients that is so important in such soils. Heavy clayey soils will lose their good physical structure and will be inclined to become poorly drained. They tend to be too wet in the spring and too dry during the summer. Losing their favorable physical qualities, they easily become severely eroded. The production of tilled crops even with artificial fertilization on such soils becomes unprofitable. Only soils of high native quality can profitably be used for agricultural purposes. The large areas of land found unsuitable for agriculture or deteriorated by unsound practices must be classed as submarginal soils, and will lie idle under present economic conditions unless they are planted for forestry purposes. New York has between four and five million acres, comprising about 15 per cent of the total land area, occupied by such idle land.

The rehabilitation of worn-out land is usually a long hard process. Fortunately, in some cases a complete cover of valuable pioneer trees will establish themselves voluntarily in a short time. This may happen if the soil is not too badly eroded or worn out and if the distance to seed trees is not too great. Generally, natural establishment of good forest trees will take a long time. The State and many private owners have therefore taken the initiative to restore idle land by planting forest trees, but, as discussed above, the soil and the microclimate are not the same as under virgin forest conditions. Hardy and not very demanding trees must be chosen for this first crop. Fortunately several commercial trees, such as red pine and Scotch pine, that are in high demand, belong in this class.

Courtesy of the Author

Forest Humus Lies as a Carpet on the Surface of the Mineral Soil

The forest plantations acting like the agriculturists' "cover crop" will gradually add leaves and other organic matter to the soil, but in most cases it will take several hundred years to rebuild a soil of the same fertility and with similar physical qualities as was found in the virgin forest.

The soil suffers most when the forest is completely removed and then used by agriculture as an inexhaustible resource, without maintenance of its fertility. Since most crops take several hundred pounds of mineral plant nutrients from the soil annually, per acre, an adequate fertilization program involving judicious use of organic and mineral fertilizers is essential to maintain the nutrient capital of the soil. In contrast, the periodic harvesting of a forest crop removes only a small fraction of the nutrient capital contained in the logs which are hauled to the mill. The bulk of the mineral nutrients contained in the branches, leaves and roots is returned to the soil to be used again. The loss in the forest crop is more than compensated for by the weathering of soil minerals and the activity of nitrogen-fixing soil organisms, so that even

under forest cropping the forest soil fertility can be maintained and even increased.

Careless logging and excessive grazing of woods may destroy good soil conditions, but it is unusual that logging alone should destroy or decrease the fertility of the natural forest soil in New York and adjacent states. There is usually an abundance of very small tree seedlings or other vegetation that will respond immediately wherever openings are made in the old forest canopy. If fire follows logging, however, as it may when large amounts of slash are left by the logging operations, all the vegetation may be killed, all or part of the humus burned, and the soil may be exposed to severe erosion.

Not so evident to the untrained eye, but far more destructive because it is so common, is uncontrolled grazing. This damage is widespread in the agricultural areas of New York. Cattle eat the young seedlings and trample the ground. In this way the soil becomes exposed to the desiccative and erosive action of the wind. Leaves are blown away from exposed areas, the surface soil dries out easily and the top soil becomes more compacted and lower in organic matter. When trees are cut or die there is no young reproduction to fill out the open areas and the soil is thus further exposed and deteriorated. Unrestricted grazing is unquestionably the most destructive influence on the forest soil productivity in the woodlots of New York.

Here in New York State our soil resources have been deprived of much of their protective mantle of forest growth. To some extent, however, they have escaped the fate of some other eastern states which have just passed through a period of the most destructive exploitation of natural resources in the history of mankind. Widely accepted soil conservation practices on the good agricultural areas, and managed forest cropping programs are returning to former productive levels much of our most valuable national heritage — the soil. Those agricultural orphans, the abandoned farms, represent our principal forest soil problem here in New York, since it is only through the healing action of forest growth that the former productivity of these lands can eventually be realized.

Acknowledgment

This Arbor and Wild Life Day number of the BULLETIN TO THE SCHOOLS was compiled with the cooperation of the New York State Museum. The editor desires to express his appreciation to Dr Carl E. Guthe, Director of the State Museum; to Alvin G. Whitney, Assistant Director, and to all who contributed articles and photographs.

A Bird with a History

The Evening Grosbeak Has Covered a Wide Range in Its Search for Food

RALPH S. PALMER
Senior Zoologist
New York State Museum and State Science Service

THE EVENING GROSBEAK is a bird with a history. It is a bird of striking appearance. The male's body is rather dull yellow in color; his wings are strikingly marked with black and white; his tail and crown are black, the latter outlined on front and sides by a bright yellow stripe. The female's pattern is similar, except that the head and back are gray and the ventral portion of the bird is pale yellowish. The stout bill aids in identifying this bird as a member of the finch family, while the relatively short tail and heavy-looking bill give the bird a very chunky and solid appearance. The total length is about eight inches. In winter this is a decidedly gregarious species, occurring in flocks of a few to 50 or 75 or even more individuals.

Let us briefly examine the known history of this beautiful finch. At one time it may have been largely confined in range to the softwood forests of the Northwest. Probably seasonal food shortages and an expanding population caused it to extend its range farther and farther southward in winters, mainly keeping to the conifers at higher elevations in the West. A century ago it also had pushed eastward to Wisconsin and, in the 1850's, it began to appear farther and farther eastward with considerable regularity. In Ontario it is known to have visited Toronto in 1854, Hamilton in 1855 and Woodstock in 1863 and 1866. In the last-mentioned year, or earlier, it may have occurred in the vicinity of New York City, but the published report is vague.

Large flocks came east to Illinois in the winter of 1870–71. The first generally accepted New York State reports are for birds seen at Elizabethtown, in Essex county, in 1875 and Marcellus, in Onondaga county, in July 1882. The first museum specimens taken in the State were collected at Buffalo in 1882.

In the winter of 1886–87 there was an extensive migration, the birds occurring south to Iowa and Kentucky and east to Ontario and New York. The next big "wave" in 1889–90, carried them southeast into Pennsylvania and northeast into Maine. The bird has occurred with increasing frequency and in larger numbers in the years since then in New York and New England. Particularly large flights occurred in the winters of 1915–16, 1917–18, in early 1944 and in 1946–47. During the present winter (1949–50) scattered flocks have occurred early and widely, but evidently food is adequate over most of the range so that no large numbers have been driven into New York. Some of the scattered flocks have made long flights, however, being reported from as far south as Maryland.

It is generally believed that these winter wanderings are caused by a food shortage in areas where the birds occurred during the breeding season. It is

Courtesy Massachusetts Audubon Society

Evening Grosbeaks at a Feeding Tray, Female Bird in the Foreground

a common phenomenon in the animal world for a species to extend its range after the breeding season; in other words, most of their traveling is done when the birds are in social flocks, after nesting duties are over and they no longer are tied to a nesting territory.

The evening grosbeak is not such a wanderer as are some of the other finches. The red and the white-winged crossbill, for example, may be absent from an area for a number of years, then the birds may come and nest during almost any month from February to October when there is a good crop of cones on spruces. In fact, they may have two broods in rapid succession. The pine siskin exhibits rather similar behavior. Not too much is known about the movements of the evening grosbeak but it definitely is not so erratic as the crossbills. Data on its seasonal movements are accumulating. It is of some interest that, as late as the early 1940's, some individuals banded in Maine are known to have flown westward to Michigan at the end of their winter visit in New England. Is a regular east-west (and vice versa) migration route of the evening grosbeak now in the making? I think not. It seems more likely that an eastern population eventually will remain in the East, having seasonal dispersal movements here.

We do know that some evening grosbeaks now nest far to the east of their former range. For example, two nests were found in Algonquin Park, Ontario, in 1946. The nests, made mainly of rootlets, were high above the ground in conifers. This finch has nested in Maine and, evidently, also in New Brunswick. Probably one factor causing this species to become established in new areas is that the visting flocks are fed quantities of sunflower seeds by various individuals and bird clubs, evidently causing the birds to linger into late spring, and some individuals even to return to be fed in summer, in a few instances. This lingering is not harmful to the grosbeaks, but they do sometimes become rather a

nuisance, driving other birds away from feeding shelves and generally ruling the roost.

Some persons have purchased and fed several hundred pounds of sunflower seeds to these birds in a single season. I have not heard of any person in New York State supplying them with more than about 500 pounds in a single winter. The feeding record may be held in Connecticut by G. Hapgood Parks, of Hartford, at whose feeding and banding station the grosbeaks consumed 775 pounds of sunflower seeds between December 13, 1945, and May 24, 1946!

What else do evening grosbeaks eat? They are particularly fond of the seeds of the box elder (*Acer negundo*). They eat the seeds of other maples, especially sugar maple (*Acer saccharum*) and Norway maple (*Acer platanoides*), and those of the ash, either when the winged seeds are on the trees or after they have fallen to the ground. A particularly handsome sight is a whole flock of evening grosbeaks gathering maple seeds on the ground under a tree. Usually, however, these birds prefer to be off the ground. They eat seeds of pine, spruce and other conifers. Another food that they like is seeds of the catalpa tree. Some fleshy fruits they commonly eat are those of red cedar (*Juniperus*), mountain ash (*Sorbus*), Virginia creeper (*Parthenocissus*) and coralberry (*Symphoricarpos*). They like seeds in the fruits of high-bush cranberry (*Viburnum opulus*). Usually the pulp of fleshy fruits is discarded and only the seeds eaten. These birds often drink water or eat snow, the latter especially if it is slushy. They are not interested in corn cracked to varying degrees of fineness, nor in a number of other items commonly put on feeding shelves for other kinds of birds.

Courtesy Massachusetts Audubon Society

The Evening Grosbeak

The voice of the evening grosbeak (both sexes) is not particularly pleasant, the commonest note being a sort of chirp sounding much like that of an English sparrow. Their main vocabulary consists of chirps in varying inflections, chattering, and, toward spring, the males sometimes utter a throaty *churr*. They make up in appearance for all that they lack in voice.

As stated before, the evening grosbeak is a bird with a history. Considering how many observers are interested in it, we are certain to learn more about that phase of its history which is now in the making. If the numbers of this wintering grosbeak increase and the birds linger late at various localities, it is not entirely improbable that someone eventually will add a whole new chapter to the story by finding its nest in the Adirondacks.

Water Chestnut: A Foreign Menace

Strenuous Measures Are Being Taken To Eradicate This Aquatic Pest

WILLIAM T. WINNE
Department of Biology
Union College

NEXT TIME you stroll along the midway at the county fair, look for the latest variation of the old shell game. Chances are that somewhere among the booths you will see a questionable individual with a fish globe containing a wondrous water chestnut all complete with crimson bloom and verdant leafage. A closer look shows that the miracle flower "grows" from a queer four-pronged nut. From such a seed any growth would be credible and many plant lovers hasten to pay a quarter for the so-called "water rose" seed.

No rose this! The water chestnut is a hardy Asian weed so persistently invasive in some of our rivers that state and national governments are spending many thousands of dollars each year to check its clotting growth. Happily the areas blanketed by the weed are restricted chiefly to the shore waters and bays of four rivers, the Hudson and Mohawk in New York State, the Sudbury in Massachusetts and the Potomac below Washington, D. C. It behooves us to contain this enemy in these infested sites and to eradicate it completely by every means in our power.

Where water chestnut grows there is an absolute end to boating, fishing, swimming or any activity requiring an open water surface, for the plants throw a thick green mat over the water and nourish the growth through a tangle of cord-like stems. As a final curse they ripen quantities of four-pronged black thorny nuts whose barbed tips easily penetrate rubber or leather and make deep entry into soft flesh. These flinty nuts lie on the mud in shallow waters and may cause severe injury to the unwary bather.

It is easy to overlook the less obvious but far more significant effects on the ecology of the shore and bay aquatic life — the smothering out of native water plants with all their associated microscopic plant and animal species. These tiny creatures are at the base of a series of life forms that eventually nourish the young of our native fish as well as other water animals. The suppressed native plants were ideal cover and can in no way be replaced in value by the water chestnut. Over the years a proper and perfect balance among the plants and animals of any single locality has been attained. This balance is not a static thing but itself changes with passing generations although its natural changes are slow and imperceptible to any one generation of men. To introduce a new species of plant or animal in this wonderful dynamic balance may be a disastrous violation of nature. We do so at our peril.

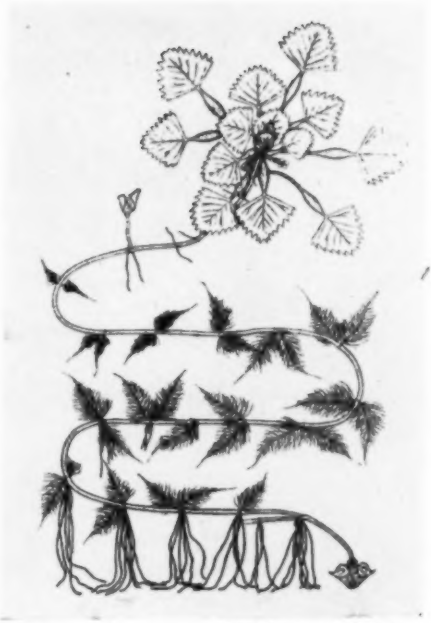
One might cite as instances of the careless introduction of foreign species that of the African snail to the Pacific islands, of the American cactus to the Mediterranean countries, of the rabbit to Australia. In each case the invader in the new habitat is freed from those restrictive forces that held it in check at home.

Its increase is so explosive that finally the ravaging effects impinge upon human activity. Then begins the frantic search for the "pound of cure."

So in the case of the water chestnut. Though we can not tell how the problem will be solved, we can actually point out its beginning in New York State where the situation begged for an "ounce of prevention."

In the early 1860's a Polish priest, Father Wibbe, toured Europe before coming to America to assume his religious duties in Schenectady, New York. Father Wibbe had a love of plants and he carried with him from Europe living seeds of the water chestnut. The good priest looked about for a suitable habitat and decided upon a little pond just north of the Mohawk river in Scotia. There the water chestnut thrived. By 1866 Father Wibbe was able to report: "*Trapa natans*, the water chestnut of Europe, was planted in Sander's lake and grows there luxuriantly." Each fall the priest and his schoolboys had a picnic by the lake and carried the seeds to spots along the shore where no plants were growing.

Well and good! Here was a little inclosed pond perfectly suited to water chestnut. There was no wide threat to native vegetation — just the encouragement of an interesting exotic plant. But when the State installed the locks and dams of the Erie Barge Canal system, blocked waters flooded back; the trickling outlet from Sander's lake to the Mohawk river became an inlet from river to lake, and the cage was broken. Water chestnut escaped to the Mohawk and spread slowly downstream. By the late 1930's it had entered the Hudson at Cohoes. It has extended downstream to the vicinity of Peekskill at the time of this writing. Upstream the spread was much slower and little has been seen above Mechanicville.



Drawing by W. T. Winne

The Whole Water Chestnut Plant

If the spread of water chestnut has been slow, it is none the less sure. Infested areas become each year more densely grown while they increase in area locally. The dense green mat along the river margins now covers some 3000 acres. Embayments are so solidly overgrown with rosettes of the plants that they appear like green land rather than water-covered areas. This increasing infestation has not been passively watched. Control measures have been tried with varying effect over a period of 15 years, chiefly under the sponsorship of the Conservation Department of New York State.

A law enacted February 23, 1949, now makes the spread of water chestnut by man an illegal act. The specific wording of this law is found in chapter 40, section 1, paragraph 170 of the Laws of New York, as follows:

No person shall plant, transport, transplant or traffic in plants of the water chestnut or in the seeds or nuts thereof nor in any manner cause the spread or growth of such plants. Any person aiding in any manner in such prohibited acts shall be deemed to have violated this section.

Any effective weed control presupposes a knowledge of the plant so complete that some weakness can be discovered and exploited. Such analysis was needed as a background for attack on the water chestnut. The plant was found to be an annual; that is, its growing parts die each fall and only the seeds carry the pest over the winter. The seeds are heavy and drop straight to the bottom under the growing plant, a factor making for rather slow dissemination. Moreover, the seeds have little resistance to drying and soon lose their power to germinate if allowed to dry out.

The plant growth is restricted to areas where depth of water is not over 16 feet. Water chestnut usually will not grow in swiftly flowing water nor in places where the soil substratum is low in organic matter. It grows exceedingly thick over mucky bottoms.

Each plant comprises two distinct parts: a rosette of floating leaves and the long coiling, cordlike stem, branching under water with its modified featherlike submerged leaves. The small white flowers are borne just at the water level in the rosette of floating leaves. Nutlike seeds which mature from the flowers tend to remain under water in the lower part of the floating leaf rosette. They cling to the plant and are released only by the rotting of the stalk in late summer or early fall.

The water chestnut's growth habit suggested a number of control practices. Since the floating leaves lay fully exposed on the surface, it seemed that a chemical contact spray would kill the plant. Ammonium thiocyanate and sodium chlorate are chemicals highly toxic to plant tissue. These applied in solution did kill all the floating leaves and turned the whole water chestnut mass a gratifying brown. But the plant had suffered the merest slap. Its growing bud lay protected in a little pool of water. Two weeks after chemical treatment there was not the least evidence of injury, and the green mat was completely reestablished.

The Spined Nut of the Water Chestnut

If chemicals would not kill, then how about straight mowing and removal of the plant? Special barges with underwater cutting attachments were built and these have proved more or less effective for small areas when the operators were almost superhumanely persistent. Success with mowing, however, is limited by the continued branching growth of the plant. Though the tops be cut off repeatedly, new shoots keep forming from below, with endless persistence. Mowing operations to be successful, then, must be begun before the first nuts have ripened and must be continued until too late in the fall for any to come to maturity before frost. With the heavy plant masses involved, the operation is costly and arduous. A most important factor

related to mowing is the frequent detachment of floating plant rosettes bearing seeds. These drifters carry the pest downstream to a new locus of infection.

With the advent of hormone sprays the road seemed clear to absolute and final water chestnut control. These insidious activators so affect the plant that its growing tissue is stimulated to an abnormal and somewhat cancerous type of growth; further, the whole plant in all its branchings is affected. After a period of writhing growth, the plant dies.

Hormone sprays of the dichlorophenoxyacetic acid (2, 4–D) type have been used with good success against water chestnut. This solution, however, is not completely perfect. Hormone sprays are not highly selective and many land-growing plants in the vicinity of spraying operations may be harmfully affected. There is some question, too, as to possible effects on other aquatic plants and on fish and primitive aquatic animal life. With improved spraying technics there seems every likelihood that we may at last contain the pest and take positive steps to eradicate it.

The New York State Conservation Department is conducting a double-barreled attack on water chestnut by combining hormone spray application with mowing by means of a special underwater cutting machine. Careful surveys of infested areas have been made and are integrated with the control project. Leroy Irving is census-taker extraordinary of our water chestnut population, and his findings are incorporated in large-scale maps of affected areas. Thus far his job is a growing one, for in addition to the infestations in the lower Mohawk river and down the Hudson to tidewater, there has been a gradual spread up the Mohawk and westward in the Barge canal nearly to Oneida lake, appearing at a few scattered stations. There are also scattered growths in the old Erie canal and Seneca river in the vicinity of Geneva and Canandaigua. And finally the pest has made a foothold in half a dozen lakes and ponds. Most of this irregular distribution is evidently the result of thoughtlessly planting the seed, or of its being transported unintentionally to new areas. Arthur Holweg and Earl Westervelt, who direct the work of control, are carrying on a critical attack, the efficiency of which is increased each year by collateral investigations such as that now being conducted to determine longevity of the seed.

In this war against water chestnut the figures for cost of removal per acre range from $25.83 when the work is done by control crews pulling the plants by hand, to $2.11 when hormone spray is applied from airplanes. Experience has shown that any single method is seldom adequate; complete eradication of the plant implies hormone spray application together with underwater cutting and manual removal.

Biological controls are always interesting to discuss even though seldom practicable. Muskrats have learned of the rich edible kernel in water chestnuts and devour many each fall and winter by gnawing away one side of the nut. A beetle of the genus *Galerucella* feeds on water chestnut leaves but is not an effective control. Where the beetle population is heaviest the leaves are more or less riddled with round holes — but no plant has died from this cause.

Observations along the Sudbury river in Massachusetts seem to indicate a relationship between luxuriance of water chestnut growth and alkalinity of the water. When increased amounts of sewage reduce the acidity, water chestnut growth seems greatly stimulated. This effect may be partly due to the increased

organic food source. Certainly water chestnut never grows in cold, clear water.

After closing the case against this weed, it seems no more than fair to a botanist to make a few arguments for the defendant. Encroachments of water chestnut have so far been limited to waters that have already suffered heavy contamination from city sewage sources. Whether the pest will continue when our deplorable sewage disposal habits have been corrected remains to be seen. Water chestnut is restricted to shallow shorewise areas and has so far not threatened the navigation in main channels, unlike the water hyacinth of the South.

◆ ◆ ◆

When the Indian Feasts

The Cherokee, Kinsman of the Iroquois, Prepares Food in Traditional Fashion

H. E. WHEELER
Director, The Museum of the Cherokee Indian

THE LARGEST Indian nation of the southeastern United States was the Cherokee, a people who anciently possessed the entire mountain region of the southern Alleghanies from southwestern Virginia to northeastern Alabama. They were settler farmers, related in speech to their distant kinsmen, the northern Iroquoian tribes in Ontario, New York, northern Pennsylvania and northeastern Ohio. At some unknown time and place, probably well to the north of their historic homeland, they had been separated from these tribes. In certain aspects of their basic economy, social structure and other cultural forms, they did not greatly differ from our own Five Nations Iroquois of New York State.

The following description of a modern Cherokee feast, based upon traditional habits from long past times, is not much different from the dietary of aboriginal days in New York if such strictly southern items as persimmons and sweet potato bread are omitted.

For the past two years the Museum of the Cherokee Indian at Cherokee, North Carolina, has staged an Indian feast in the fall, and it has proved of such interest that it will probably become an annual event.

Since so many of our foods came by way of the Indian, and especially from these Indians of the Appalachian mountains, we decided that nothing except real Indian foods would be served. That left out butter, for the Cherokee has no butter; not even the name for it is in his language; salt was used very sparingly; there was no coffee or tea, no cake and

ice cream, no plum pudding or wines. But none of the guests — and they came from many states — were disappointed, and they had something more than a pink tea. It was a feast indeed.

On our hunt for meat we secured not only venison and bear, wild turkey and other small game, but we even had buffalo and, by all means, rattlesnake. These Cherokees insist that anciently they did not cook such reptiles though they were not averse to locusts and wild honey, and shellfish of any kind. We wanted to serve mountain oyster — just snails — but for so many guests that would have been rather impossible to obtain.

When the Indian women got under way with their cooking you would have been surprised to see the tables loaded with so many vegetables, deliciously prepared in their own way. Succotash, beans, artichokes, wild potatoes, greens, corn (real honest-to-goodness Indian corn) on the cob or cooked with fish as an olla-podrida, candy roasters (an Indian squash) and a dozen or more tempting concoctions.

As for bread, there was the chestnut bread, which is an Indian stand-by, the tuya bread, which is a pone of dough generally baked in the ashes, with the large fine tuya beans stuck in like raisins. But there was no flour, for the Indians did not have it and did not believe that sort of food was good for a mountain brave or for his family either.

What did the Indian have to drink? No liquor, to be sure, for that unworthy gift of the white man made a fool of the Indian, who took to it too readily, and his people finally had to turn thumbs down on its use. The first temperance societies in America were those of the Cherokees with their almost unanimous membership. When a German scholar gave his order for dinner in the near-by cafeteria on the reservation and called for beer, this staggered the waitress and the answer astonished the German. The tribe today allows nothing in the way of alcoholics in its territory.

But they had plenty to drink. Not tea or milk, nor even soft drinks. But first of all the cold sparkling water from their mountain springs and streams, though I confess even that would have tasted better from a gourd dipped into the stream itself. Then the spicewood tea — and the stems for making this must be quite fresh for the best results. Then, of course, the sassafras tea, which has not lost its charm for modern connoisseurs. Best of all was the sumacade. What an overlooked and very delicious beverage! It is so little trouble to make and the cost is negligible. Just get the red sumac when it

Courtesy of the Cherokee Museum

A Small Corner of the Food Exhibit

is ripe in the fall, but only the red berries, mind you, for the white sumac is poisonous. Rub these berries off very gently in a large pan of cold water, being careful not to bruise them as the acid in the surface hairs is the essential thing; then strain, add sugar, and drink the most delicious sumacade you ever tasted.

Imagine a huge plate loaded with a generous sample of all these meats and vegetables, to say nothing of the jams and jellies made from the mountain fruits including strawberries, mountain raspberries, crab apples, goose plums, fox and possum grapes; all sorts of nuts within easy reach — butternuts, chestnuts, scaly-barks, black walnuts, hazel nuts, edible acorns and beechnuts. But you were not offered any cigars, not even a peace pipe, for the ancient Indian did not habitually smoke the tobacco which he gave to the white man. To the Indian, tobacco was a truly religious symbol, the smoke ascending like incense to the Great Spirit to whom he was offering his thanks for all good gifts.

Remember that the ancient Indian was the most hospitable host this country ever knew. To cross his threshold was to be a guest under a solemnly accepted pledge of his protection. Even though you were an enemy, while you were his guest you were treated as a brother — though he was at liberty to obey any other impulse when you had left his cabin. The Indian made no charge for whatever you received as his guest; room and board were free for as long as you desired to stay. You can see from the older illustrations of his cooking how bountifully he served, what immense stone rolling pins he had to use, what huge bread trays and enormous pots for outdoor boiling, what generous hunks of bear meat or venison he had ready and how thoroughly he enjoyed the social amenities of the forest life.

Courtesy of the Cherokee Museum

Moses Owl and His Wife with a 14-pound Granite Ax He Has Skilfully Hafted

It may be that times have changed, but we can say that we tried to emulate the ancient Indian's custom and heaped the plates of our guests high with these various primitive foods, adding an entertainment of Indian songs and dances and the address of a distinguished anthropologist. If you come to see what will be offered this fall, you will find the feast staged on the side of the Great Smoky mountains, around a traditional campfire, with all the cooking done by the Indians in their own way.

You may be sure that you will eat nothing that has not been grown on the little farms of the Reservation Indians or gathered from the wild.

Eastern Red-Wing, Guardian of the Marsh

ONE OF THE MOST COLORFUL and easily recognized of our early spring arrivals, the male red-winged blackbird, somewhat smaller than a robin, is a familiar sight in and near fresh-water marshes. Here you may find him perched on a cattail or in some near-by tree displaying his scarlet epaulets and giving his characteristic *o-ka-leeé* call. You are likely, too, to hear his piercing, two-syllable whistle. His smaller, streaked mate, looking like an overgrown sparrow with a sharp bill, is much more difficult to observe.

The first spring arrivals come in small flocks, sometimes as early as the second week in February when ice may still be found on the marshes. It is March, however, before widespread movement starts and the peak of the migration is not reached until late in the month. The flocks, consisting of several hundred or at times thousands of red-wings, migrate by day. It is a thrilling experience to watch them settle into a marsh in the evening.

The contrasting colors of the males, females and immature birds have enabled ornithologists to work out the migratory timetable of the red-wing. Although the dates vary from year to year and place to place, the order of arrival remains the same. Adult males precede adult females and immatures which hatched the preceding year. (It takes two years to reach full adult plumage.) Migrants which will nest farther north precede the summer residents which will remain.

The males first establish their respective territories and then await the arrival of the females, two weeks or more later. A male may have more than one mate. The deeply hollowed, strongly constructed nest of grass and sedges usually is built low down among the growing reeds, cattails or other marsh plants only a foot or two above the water. The three to five pale bluish green eggs have irregular dark markings. The height of the nesting season is in June.

After about two weeks of incubation by the female, the eggs hatch and the nearly naked young emerge. Most of their care seems to devolve upon the mother, who feeds them and keeps the nest clean. When feeding, red-wings often may be seen searching for grain, weed seeds and insects in fields and orchards nearly a mile away from their marsh. The male birds stand guard and are quick to challenge any intruder and boldly chase crows, herons and even hawks, as well as smaller birds, in this respect resembling the fearless kingbird. The young are fully feathered and leave the nest after about 11 days. There may be a second brood.

Red-wings begin flocking in July and are abundant in every marsh until the last of August. Then they suddenly disappear for several weeks. During this period they are molting and remain hidden in the marshes as their short wings and tails make flight difficult. During the fall, from September to November, they leave for their winter quarters in the southeastern states, but a few stragglers may persist all winter.

MYRTICE A. BLATCHLEY

Museum Education Supervisor
New York State Museum